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CS 499: Computer Science Capstone

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# **CS 499 Milestone Four**

**Enhancement Three: Databases**

For this milestone, I focused on improving the database functionality within my *Travlr* Getaways web application. This project, originally built in CS 465 using Node.js, Express, Angular, and MongoDB, now includes more advanced data handling and secure integrations that highlight my skills in database management and software design.

The main enhancement involved restructuring the MongoDB user model to store past trips and using that data to generate personalized trip recommendations. This allows the system to return suggestions based on previous travel history, showcasing a practical example of how databases can drive personalization through efficient queries and algorithmic design. These improvements demonstrate my ability to design and evaluate solutions using both data structures and algorithmic principles.

I also expanded the project’s security features by improving how user authentication and activity logging interact with the database. Two factor authentication (2FA), login rate limiting, and event logging were tied directly to MongoDB, creating a more traceable and secure environment. This ensures that all login attempts—successful or failed—are recorded and can be analyzed to maintain system integrity.

While implementing these features, I learned how to balance performance, structure, and security within a live data environment. I also became more familiar with query optimization, schema flexibility, and the value of clean relationships between the back end and the user interface. These updates reflect both growth in technical skill and an understanding of how well-designed databases support functionality, scalability, and user experience.

Overall, this enhancement strengthened the *Travlr* Getaways platform by moving it closer to a real-world system capable of adapting to users through intelligent, data-driven design while maintaining strong security practices.